WHAT IS CLAIMED IS:

1. A dense wavelength division multiplexing-passive optical network system utilizing self-injection locking of Fabry-Perot laser diodes, the system comprising:

a central office for generating first optical signals of different wavelengths, and transmitting the first optical signals to a remote node, while receiving second optical signals of different wavelengths from the remote node;

the remote node for demultiplexing a multiplexed signal of the first optical signals transmitted from the central office, and transmitting the demultiplexed first optical signals to respective optical network units (ONUs), the remote node also multiplexing the second optical signals transmitted from respective ONUs, and transmitting the multiplexed signal of the second optical signals to the central office; and

the ONUs for receiving the first optical signals transmitted from the remote node, respectively, the ONUs also generating the second optical signals of different wavelengths, and transmitting the second optical signals to the remote node, respectively,

wherein the central office includes a first partial mirror adapted to partially feed back the multiplexed signal of the first optical signals transmitted to the remote node, thereby self-injection locking a plurality of first transmitters included in the central office, and

wherein the remote node includes a second partial mirror adapted to partially feed back the multiplexed signal of the second optical signals transmitted to the central office, thereby self-injection locking a plurality of second transmitters included in respective ONUs.

2. The dense wavelength division multiplexing-passive optical network system according to claim 1, wherein the central office includes:

the first transmitters for outputting the first optical signals of different wavelengths, respectively;

a plurality of first receivers for receiving the second optical signals transmitted from the remote node, respectively;

a plurality of first multiplexers/demultiplexers each adapted to output the first optical signal received from an associated one of the first transmitters while demultiplexing an associated one of the second optical signals transmitted from the remote node along with a part of the first optical signal fed back thereto;

a second multiplexer/demultiplexer for multiplexing the first optical signals respectively outputted from the first multiplexers/demultiplexers while demultiplexing the multiplexed signal of the second optical signals transmitted from the remote node along with a part of the multiplexed signal of the first optical signals fed back thereto; and

the first partial mirror for partially feeding back, to the second multiplexer/demultiplexer, the multiplexed signal of the first optical signals outputted from the second multiplexer/demultiplexer.

3. The dense wavelength division multiplexing-passive optical network system according to claim 2, wherein the second multiplexer/demultiplexer is an AWG type multiplexer/demultiplexer.

4. The dense wavelength division multiplexing-passive optical network system according to claim 2, wherein the first transmitters are injection-locked by the fed-back part of the first optical signals.

5. The dense wavelength division multiplexing-passive optical network system according to claim 1, wherein the remote node includes:

a third multiplexer/demultiplexer for demultiplexing the multiplexed signal of the first optical signals transmitted from the central office while multiplexing the second optical signals transmitted from respective ONUs along with a part of the multiplexed signal of the second optical signals; and the second partial mirror for partially feeding back, to the third multiplexer/demultiplexer, the multiplexed signal of the second optical signals outputted from the third multiplexer/demultiplexer.

6. The dense wavelength division multiplexing-passive optical network system according to claim 5, wherein the third multiplexer/demultiplexer is an AWG type multiplexer/demultiplexer.

7. The dense wavelength division multiplexing-passive optical network system according to claim 1, wherein respective ONUs include:

the second transmitters for transmitting the second optical signals, respectively;

a plurality of second receivers for receiving the first optical signals transmitted from the remote node, respectively; and

a plurality of fourth multiplexers/demultiplexers each adapted to output the second optical signal received from an associated one of the second transmitters while demultiplexing an associated one of the first optical signals transmitted from the remote node along with a part of the second optical signal fed back thereto.

8. The dense wavelength division multiplexing-passive optical network system according to claim 7, wherein the second transmitters are injection-locked by the fed-back part of the second optical signals.